

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : A23L 1/22, A61K 7/16, A23L 1/231, A21D 13/00	A1	(11) International Publication Number: WO 00/67595 (43) International Publication Date: 16 November 2000 (16.11.00)
(21) International Application Number: PCT/IB00/00711 (22) International Filing Date: 4 May 2000 (04.05.00) (30) Priority Data: 09/306,262 6 May 1999 (06.05.99) US (71)(72) Applicants and Inventors: ZERBE, Horst, G. [CA/CA]; 714 Main Road, Hudson, Québec J0P 1H0 (CA). AL-KHALIL, Fadia [LB/LB]; 4 Van Riper Court, Lincoln Park, NJ 07035 (US). (74) Agent: CARRIER, Robert, J.; Price, Heneveld, Cooper, DeWitt & Litton, 695 Kenmoor, S.E., P.O. Box 2567, Grand Rapids, MI 49501-2567 (US).		(81) Designated States: CA, JP, MX, PL, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
(54) Title: RAPIDLY DISINTEGRATING FLAVOR WAFER FOR FLAVOR ENRICHMENT (57) Abstract A sheet-shaped flavored film that rapidly disintegrates when placed on the surface of certain substrates and releases a natural or artificial flavor to the substrate to enhance or modify the intrinsic flavor of the substrate is provided. The flavored film includes one or more water-soluble polymers, one or more surfactants, and one or more flavoring agents. The flavored film has numerous applications in the food and food service industry wherein an easy to use, inexpensive and reproducible method of flavoring food products is desired.		

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

RAPIDLY DISINTEGRATING FLAVOR WAFER
FOR FLAVOR ENRICHMENT
BACKGROUND OF THE INVENTION

5 A broad variety of food products and other consumer products requires the addition of artificial and/or natural flavors in order to either add a certain taste and/or odor to the product, or to enhance its intrinsic flavor of the product, or to modify it. Also, flavors are commonly being added to products that naturally contain flavors in order to satisfy the desire of the consumer for products with precise taste reproducibility.

10 In other cases, a food product, if prepared according to its standard method of preparation, may lack of certain taste characteristics that may be desired by the consumer. For example, a hamburger product that is being prepared using a hot steel plate will not acquire the taste of grilled meat which is usually only achieved by flame-broiling the product.

15 Numerous other applications in the food and food service industry demonstrate the desire for an easy-to-use, cheap, and reproducible method of flavoring food products or intermediates. In the case of pre-manufactured pizza dough, there is a need to add natural or artificial garlic flavor or other pizza flavors to the dough.

 In the case of pre-manufactured fruitcakes, a number of problems are

20 encountered that so far have not been resolved successfully: fruits that are used as toppings for fruit cakes are natural products and therefore exhibit a natural variability in their content of flavor components. In order to provide the customer with a product that always exhibits the same taste characteristics, there is a need to add flavor to the product, or to enhance or modify the initial flavor. However, when the fruit mix is

25 applied to the surface of the dough, the moisture of the fruit mix upon storage migrates into the dry dough causing it to become soggy.

 The same problem is being encountered during the production of ice cream products: Certain ice cream products involve waffles to sandwich the ice cream. Upon storage, the waffles tend to become soggy, thus making the product less attractive.

30 Various attempts have been made to overcome these problems. It has been tried to apply artificial grill flavor to hamburger products by sprinkling the flavor oil directly onto the hamburger. Also, it has been tried to formulate the artificial grill flavor into a paste and apply this flavor-containing paste onto the hamburger using a caulking gun.

Yet another attempt to solve the problem involved spreading the flavor oil, or a paste containing the flavor oil on the hamburger using a spatula, knife, or similar tools.

5 However, all techniques that have so far been used to solve the above problem show significant disadvantages that limit their applicability or even prevent them from being used in a professional restaurant environment. They are either too complicated and, when applied by the restaurant personnel, bear the risk of insufficient and uneven distribution of the flavor on the product. When using these techniques, the quantity of flavor applied to the hamburger may vary significantly, thus causing unacceptable taste variations in the product. Since in the fast-food industry product acceptance and brand
10 identification are closely associated with a precise reproducibility of the taste, these techniques do not provide an acceptable solution to the problem. More importantly, the process of applying the flavor by manually spreading or sprinkling it on the product is slow and increases the manufacturing cost of the product which represents a significant disadvantage in the highly competitive fast-food industry.

15 The attempts to add garlic flavor or other pizza flavors to pre-manufactured pizza dough by directly formulating it into the dough have been unsuccessful, either because the packaging materials are not sufficiently resistant to permeation of the flavor, or because the garlic flavor has been altered under the storage conditions of the products in the retail store. An additional advantage of formulating the garlic or pizza flavor into a wafer according to the present invention may be that the moisture from the topping will
20 be held back thus preventing it from migrating into the dough and making it soggy. The same beneficial effect of the wafer according to the present invention of preventing moisture to migrate into the substrate may be favorably used to prevent the waffles of ice cream sandwiches to become soggy.

25 While the use of mucoadhesive, more or less rapidly disintegrating films for delivering breathfreshening and/or other flavoring agents to the oral cavity is known in the field, the use of wafer-like films according to the present invention for adding or modifying or enhancing flavors in food, food service, cosmetic, or pharmaceutical products has hitherto not been disclosed. PCT Publication WO 98/20862 and the
30 corresponding US Patent 5,948,430 issued September 7, 1999, disclose rapidly dissolving films that can be adhered to the oral cavity thereby releasing cosmetically active agents like breathfreshening agents, said film comprising of water-soluble polymers, one or more polyalcohols, and cosmetically or pharmaceutically active agents.

Optionally, the film may contain plasticizers or surfactants, flavors, flavor enhancers, or other ingredients commonly being used to modify or enhance the flavor of compositions commonly used for application to the oral cavity. In a similar way, US 5,700,478 discloses pressure-sensitive adhesives that may adhere to mucosal surfaces and that are intended to release breathfreshening agents to the oral cavity. Other films that disintegrate under the influence of water can be used for purposes like dental cleansing, as described in EP 0 452 446 B1.

The use of wafer-like films to improve certain properties of food products is known in the field. US 3,753,732 describes the use of a wafer that is intended to be used for bakery enrichment. It is made by adding starch to certain nutrients and compressing the mixture to wafer-like tablets which may then be used for bakery enrichment. EP 0 273 069 A1 describes edible films consisting of neutral polysaccharides and polyalcohols that can be eaten directly, but when placed on the surface of certain food products, can prevent moisture from migrating into the substrate, or alternatively keep fragrances and/or seasoning agents in the food item. However, none of the techniques so far disclosed provide a satisfactory solution to the above problem, or contemplates the use of a wafer-like flavor film product according to the present invention to add flavor(s) to a food, food service, cosmetic, or pharmaceutical product, or to enhance or modify the intrinsic flavor of such products.

SUMMARY OF THE INVENTION

The present invention contemplates a more or less rapidly disintegrating sheet-shaped, wafer-like flavor film that, when placed on the surface of food, food service, cosmetic, or pharmaceutical products, disintegrates at a predetermined rate, thereby releasing the natural or artificial flavor to the food, cosmetic, or pharmaceutical product, thus adding a certain desired taste and/or odor to the substrate, or enhancing or modifying the intrinsic flavor of the substrate. Optionally, the film may be used to prevent moisture from migrating into the food, food service, cosmetic, or pharmaceutical product. The film is manufactured using conventional coating and drying techniques, cut into pieces of a shape and size that meet the requirements of the intended application, and packaged into suitable containers.

DETAILED DESCRIPTION OF THE INVENTION

While this invention is susceptible to embodiment in many different forms, preferred embodiments of the invention are shown. It should be understood, however, that the

present disclosure is to be considered an exemplification of the principle of this invention and is not intended to limit the invention to the embodiments illustrated.

5 A variety of polymers are known to be useful for the preparation of more or less rapidly disintegrating films. One type of material that is suitable to form films according to the present invention comprises water-soluble polymers. Preferred water-soluble polymers are water-soluble polyvinyl pyrrolidones. More preferred are polyvinyl pyrrolidones with a K-value between 20 and 90. Polyvinyl pyrrolidones with a K-value between 25 and 60 are particularly preferred.

10 Hydroxyethyl cellulose, when combined with polyvinyl pyrrolidone at a ratio of 1: 2 - 3 : 1, hydroxypropyl-methyl cellulose, when combined with polyvinyl pyrrolidone at a ratio of 1 : 4 - 4 : 1, and polyvinyl alcohol, when combined with polyvinyl pyrrolidone at a ratio of 1 : 5 - 1 : 1, are also more preferred water-soluble polymers. Other optional water-soluble polymers, without limiting the invention, include hydroxypropyl cellulose, carboxymethyl cellulose, sodium alginate, guar gum, 15 tragacantha, arabic gum, acacia gum, xanthan gum. A film according to the present invention may also contain water-dispersible polyacrylates, like carboxyvinyl copolymers, methylmethacrylate copolymer, or polyacrylic acid. Other optional polymers include water-swellaable, but not water-soluble, crosslinked carboxyfunctional polymers, like polycarbophil.

20 The surfactants used to prepare a film according to the present invention are a mixture of nonionic surfactants. Preferable mixtures are combinations of a polyoxyethylene sorbitan fatty acid ester, a polyoxyethylene alkyl ether, or a polyoxyethylene castor oil derivative with one or more polyalcohols. More preferably, the mixture is comprised of a polyoxyethylene sorbitan fatty acid ester and glycerol. The 25 BLB value of the polyoxyethylene sorbitan fatty acid ester should be greater than 10, but not exceed 20. Other optional polyalcohols are propylene glycol, polyethylene glycol, or other polyalcohols commonly used in food, food service, cosmetic, or pharmaceutical products.

30 The ratio of the polyoxyethylene sorbitan fatty acid ester and the polyalcohol should range between 100: 1 and 10: 1, and the total concentration of surfactants in the film should not exceed 30%. The surfactants solubilize the flavor components. In those cases, where the incorporation of the flavor components into the mixture is possible without the use of a surfactant, the use of surfactants is not required. This may be the

case if flavor components are used that possess self-emulsifying properties. In the context of this invention, a flavor component is self-emulsifying if it forms a stable emulsion with the other components of the coating solution without the addition of surfactants.

5 Natural or artificial flavor components may include grill flavor, garlic flavor, pizza flavor, natural or artificial fruit flavors, or other artificial or natural flavors or spices commonly used in food, food service, cosmetic, or pharmaceutical products. The effect of these flavors may be enhanced using flavor enhancers like tartaric acid, vanillin, or the like. A film according to the present invention is prepared by forming a coating solution, coating it onto a suitable carrier material, drying it, and cutting it into
10 pieces of a size and shape suitable for the intended application of the film. Coating solutions according to the present invention are prepared using solvents that are compatible with the ingredients used for the film. The solvents must be acceptable for food, food service, cosmetic, and pharmaceutical products.

15 Examples, without limitation, of compatible solvents include water, ethyl alcohol, isopropyl alcohol, or mixtures thereof. The procedure for the preparation of coating solutions according to the present invention is as follows: To a mixture of suitable solvents, the surfactant, polyalcohol, flavor component, and polyvinylpyrrolidone are added under continuous stirring using a suitable stirring device
20 until a clear solution has been formed. To the clear solution, the water-soluble or waterdispersible polymer or mixture of water-soluble polymers is slowly added under continuous stirring until a clear and homogeneous solution has been formed. The solution is coated onto a suitable substrate, dried, and cut into pieces of a size and shape suitable for the intended application. A variety of coating methods, such as Meyer rod,
25 knife over roll, gravure, or reverse roll can be used to coat and oven-dry the film. These coating and drying techniques are known to the expert in the field. Suitable substrates include non-siliconized kraftpaper, non-siliconized polyethylene-terephthalate film, non-siliconized polyethylene film, or the like. Depending upon the intended application and the desired properties of the final product, the thickness of the dry film may vary. The
30 thickness depends on the concentration of solids in the coating solution, the gap on the coating head, and on the web speed. It can vary between 10 and 250 μm .

The dry film is cut into pieces that are suitable for the intended application. The techniques to cut the dry film are known to the expert and may include roller dies, flat-bed cutting knives, or the like. The present invention is further illustrated by the following examples.

5

EXAMPLE 1:

70 g of Polysorbate 80 and 3 g of Glycerol are thoroughly mixed (Premix 1). In a separate container, 132 g of Hydroxypropyl methylcellulose 50 cps and 50 g of Hydroxypropyl methylcellulose 100 cps are also thoroughly mixed (Premix 2).

10

A mixture of 750 ml Ethanol and 2375 ml water is heated to 60°C. 73 g of Premix I are added slowly under continuous stirring. After a clear solution has been formed, 20 g of artificial grill flavor are added under vigorous stirring. After a clear solution has been formed, 105 g of Povidone 30 are added slowly under continuous stirring until a clear solution has again been formed. To the clear solution, 182 g of Premix 2 are added slowly under continuous stirring until a clear solution has been formed. The solution is then allowed to cool to room temperature and coated onto non-siliconized kraft paper or any other suitable carrier material using a knife-over-roll coater. The coating gap and the web speed are set such that a thickness of the dry film of 50 - 150 μm is achieved. The temperature settings on the oven depend on the length of the drying oven. The drying temperature has to be set to remove the solvents completely, or almost completely, from the film. The resulting film is peeled off the substrate and cut into pieces of a shape and size suitable for the intended use.

15

20

A piece of the film was placed onto the surface of a grilled hamburger and covered with the hamburger roll, adding the taste of grilled meat to the product.

25

EXAMPLE 2:

100 g of Povidone 30 (Plasdone S-630, ISP), 100 g of Kollidon 30 and 75 g Polyvinylalcohol are thoroughly mixed (Premix 3). 2300 ml water are heated to 60°C. 275 g of Premix 3 are added slowly under continuous stirring until a clear solution has been formed. To the clear solution, 150 g of Hydroxyethyl cellulose are added slowly under continuous stirring. The stirring is continued until a clear solution again has been

30

formed. The solution is then allowed to cool to room temperature. Under vigorous stirring, 75 g of natural grill flavor (Givaudan-Roure) are added. The mixture is homogenized using a rotor/stator homogenizer until a stable emulsion has been formed. The coating solution is coated onto non-siliconized kraft paper using a knife-over-roll coater or any other conventional coating and drying equipment. The coating gap and the web speed are set such that a thickness of the dry film of 50 - 150 μm is achieved. The temperature settings on the oven depend on the length of the drying oven. The drying temperature has to be set to remove the solvents completely, or almost completely, from the film. The resulting film is peeled off the substrate and cut into pieces of a shape and size suitable for the intended use.

EXAMPLE 3:

Thoroughly mix 125 g of Plasdane S-630, 125 g of Kollidon 30 and 75 g of Polyvinylalcohol (Premix 4). Heat 2300 ml of water to 60°C. Slowly add 325 g of Premix 4 under continuous stirring until a clear solution has been formed. To the clear solution, slowly add 150 g of Hydroxypropyl methylcellulose 50 cps and continue stirring until a clear solution has been formed. Allow the solution to cool to room temperature.

Under vigorous stirring, slowly add 25 Natural Spiceolate Garlic (Givaudan Roure). Homogenize the mixture using a rotor/stator homogenizer. The coating solution is coated onto non-siliconized kraft paper using the procedure as described in the previous example.

A piece of the film was placed on fresh pizza dough and covered with commonly used, yet garlic-free pizza toppings, adding the taste of fresh garlic to the baked pizza.

EXAMPLE 4:

Thoroughly mix 125 g of Plasdane S-630, 125 g of Kollidon 30 and 75 g of Polyvinylalcohol (Premix 4). Heat 2300 ml of water to 60°C. Slowly add 325 g of Premix 4 under continuous stirring until a clear solution has been formed. To the clear solution, slowly add 150 g of Hydroxypropyl methylcellulose 50 cps and continue stirring until a clear solution has been formed. Allow the solution to cool to room

temperature. Under vigorous stirring, slowly add 25 g Natural Spiceolate Pizza (Givaudan Roure). Homogenize the mixture using a rotor/stator homogenizer. The coating solution is coated onto non-siliconized kraft paper using a knife-over-roll coater following the procedure as described in the previous example.

What is claimed is:

- 5 1. A sheet-shaped flavored film for the addition or modification of one or more flavors to food, food service, cosmetic, or pharmaceutical products.
2. A flavored film according to claim 1 comprising one or more water-soluble polymers, one or more surfactants, and one or more flavoring agents.
- 10 3. A flavored film according to claim 2, wherein the water-soluble polymer is of the group consisting of hydroxyethyl cellulose, hydroxypropylmethyl cellulose, hydroxypropyl cellulose, polyvinyl pyrrolidone, carboxymethyl cellulose, polyvinyl alcohol, sodium alginate, polyethylene glycol, xanthane gum, tragacantha, guar gum, acacia gum, arabic gum, pregelatinized starch, polyacrylic acid, methylmethacrylate
15 copolymer, carboxyvinyl copolymers, or mixtures thereof.
4. A flavored film according to claim 3, wherein the composition of water-soluble polymers is not less than 60%, by weight.
- 20 5. A flavored film according to claim 2, wherein the surfactant is of the group consisting of polyoxyethylene sorbitan fatty acid ester, polyoxyethylene alkyl ether, polyalcohol, polyoxyethylene castor oil derivative, or a mixture thereof.
- 25 6. A flavored film according to claim 5, wherein the polyalcohol is glycerol, polyethylene glycol, or propylene glycol.
7. A flavored film according to claim 2, wherein the flavor component comprises artificial or natural grill flavor, artificial or natural garlic flavor, artificial or natural pizza flavor, or any other natural or artificial flavoring agents or spices commonly used
30 to flavor food, food service products, or cosmetic products.
8. A flavored film according to claim 7, wherein the concentration of the flavor component in dry film is between 5 and 35% (w/w).

9. A method of preparing flavor films according to claim 1 comprising dispersing a flavor component in a solution of water-soluble polymers, coating and drying said dispersion onto a carrier material, separating the dry film from the carrier material,
5 cutting the dry film into pieces of suitable size and packaging it into suitable containers.

10. A method according to claim 9, whereby the solvent used to dissolve the water-soluble polymer consists of water or a mixture of water and an organic solvent.

10 11. A method according to claim 10, whereby the organic solvent is of the group consisting of ethyl alcohol, isopropyl alcohol, acetone, or mixtures thereof.

12. A method according to claim 9, whereby the carrier material is comprised of non-siliconized kraft paper, non-siliconized polyethylene-terephthalate, or a non-siliconized polyolefin.
15

13. A flavored film according to claim 2, whereby the dry film has a thickness of 20 - 500 μm .

INTERNATIONAL SEARCH REPORT

Internatk Application No
PCT/IB 00/00711

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A23L1/22 A61K7/16 A23L1/231 A21D13/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A23L A61K A21D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, FSTA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98 20862 A (LOHMANN THERAPIE SYST LTS ;ZERBE HORST GEORG (US); GUO JIAN HWA (U) 22 May 1998 (1998-05-22) cited in the application claims 1-7,9; examples 1-5 page 3, paragraph 3 -page 7, paragraph 4	1-13
X A	EP 0 219 762 A (DESTITIN ARZNEIMITTEL GMBH) 29 April 1987 (1987-04-29) claims 1-7,13; example 1 column 2, line 43 -column 3, line 9 column 4, line 1 -column 5, line 31 column 6, line 9-28 column 9, line 31-34 -column 10, line 1-5,17-23	1-3,5-8, 13 4,9-12
	— — — — — -/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

17 October 2000

Date of mailing of the international search report

25/10/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3018

Authorized officer

Tallgren, A

INTERNATIONAL SEARCH REPORT

Internat Application No

PCT/IB 00/00711

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 95 05416 A (BIEGAJSKI JAMES E ; VENKATRAMAN SUBBU S (US); SCOTT ANN M (US); CYG) 23 February 1995 (1995-02-23) cited in the application claims 1,3-8,31,32,45; examples 1,7,16,20,21 page 11, line 26 -page 13, line 21	1-3,5-8
A	A mucoadhesive product comprising of water soluble polymer, surfactant and flavor. page 23, line 20 -page 25, line 5	4,9-13
X	US 4 136 145 A (FUCHS PETER ET AL) 23 January 1979 (1979-01-23)	1-7, 9-11,13
A	claims 1-9; examples 15,19 column 2, line 65 -column 3, line 36 column 3, line 56 -column 4, line 16	8,12
X	US 5 047 244 A (SANVORDEKER DILIP R ET AL) 10 September 1991 (1991-09-10) example 18 column 3, line 60 -column 4, line 11 column 5, line 25-43,52 -column 6, line 8 column 7, line 34-37	1-3,5-8
A		4,9-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internatic Application No

PCT/IB 00/00711

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9820862	A	22-05-1998	DE 19646392 A	14-05-1998
			AU 4868297 A	03-06-1998
			CZ 9901647 A	11-08-1999
			EP 0936905 A	25-08-1999
			HU 9904207 A	28-04-2000
			NO 991921 A	22-04-1999
			US 5948430 A	07-09-1999
EP 0219762	A	29-04-1987	AT 59289 T	15-01-1991
			AU 6541786 A	05-05-1987
			CA 1275046 A	09-10-1990
			DE 3676626 D	07-02-1991
			WO 8702241 A	23-04-1987
			EP 0283474 A	28-09-1988
			GR 3001238 T	30-07-1992
			JP 63501794 T	21-07-1988
			US 4849246 A	18-07-1989
WO 9505416	A	23-02-1995	AU 7568394 A	14-03-1995
			CA 2169729 A	23-02-1995
			CN 1134163 A	23-10-1996
			EP 0717761 A	26-06-1996
			JP 9504810 T	13-05-1997
			US 5700478 A	23-12-1997
US 4136145	A	23-01-1979	DE 2432925 A	22-01-1976
			DE 2449865 A	29-04-1976
			AT 346492 B	10-11-1978
			AT 513275 A	15-03-1978
			AU 8252775 A	06-01-1977
			BE 831024 A	05-01-1976
			CA 1067407 A	04-12-1979
			CH 625704 A	15-10-1981
			CS 181182 B	31-03-1978
			DD 122196 A	20-09-1976
			DK 295075 A, B,	06-01-1976
			EG 11756 A	30-11-1977
			ES 439159 A	16-05-1977
			FI 751801 A, B,	06-01-1976
			FR 2276811 A	30-01-1976
			GB 1510999 A	17-05-1978
			HU 173016 B	28-01-1979
			IE 42604 B	10-09-1980
			IL 47573 A	31-10-1978
			IN 142428 A	09-07-1977
			JP 1304926 C	28-02-1986
			JP 51029218 A	12-03-1976
			JP 60028810 B	06-07-1985
			NL 7507785 A, B,	07-01-1976
			NO 752416 A	06-01-1976
			PH 18973 A	26-11-1985
			RO 68836 A	15-07-1980
			SE 413285 B	19-05-1980
			SE 7507659 A	07-01-1976
			US 4136162 A	23-01-1979
			ZA 7504305 A	30-06-1976
US 5047244	A	10-09-1991	NONE	